

What is Claimed:

1. A stabilizer for use in a drill string for drilling a bore hole,
comprising:
 - a) a stabilizer body adapted to be mounted in said drill string;
 - b) a first stabilizer blade affixed to said stabilizer body, said first
5 stabilizer blade having a distal end adapted to engage said bore hole;
 - c) a sleeve rotatably mounted on said stabilizer body; and
 - d) at least a pair of circumferentially displaced second stabilizer
blades projecting radially outward from said sleeve, said pair of second
10 stabilizer blades rotating in a common circumferentially extending plane
axially displaced from said first stabilizer blade.
2. The stabilizer according to claim 1, further comprising a locking
mechanism for locking said sleeve in first and second circumferential orientations.
- 15 3. The stabilizer according to claim 2, wherein when said sleeve is in
said first circumferential orientation, the midpoint between said pair of second blades is
substantially axially aligned with said first stabilizer blade.
- 20 4. The stabilizer according to claim 3, wherein when said sleeve is in
said second circumferential orientation, the midpoint between said pair of second
stabilizer blades is substantially opposite said first stabilizer blade.
- 25 5. The stabilizer according to claim 2, wherein said first and second
circumferential orientations are spaced approximately 180° apart.
6. The stabilizer according to claim 1, wherein the centers of said distal
ends of said second stabilizer blades are circumferentially displaced by an angle of at
least about 60°.

7. The stabilizer according to claim 1, further comprising a sensor mounted in said distal end of at least one of said blades for sensing a property of a formation through which bore hole is drilled.

5 8. A stabilizer for use in a drill string for drilling a bore hole, and through which a drilling fluid flows, comprising:

a) a stabilizer body adapted to be mounted in said drill string;

b) a sleeve rotatably mounted on said stabilizer body;

c) a stabilizer blade projecting radially outward from said sleeve;

10 d) a movable locking member, said locking member locking said sleeve into a first circumferential orientation when said locking member is in a first position and unlocking said sleeve when said locking member is in a second position, whereby said sleeve can rotate around said stabilizer body when unlocked.

15 9. The stabilizer according to claim 8, wherein said locking member also locks said sleeve into a second circumferential orientation.

20 10. The stabilizer according to claim 8, further comprising a piston coupled to said locking member, whereby actuation of said piston drives said locking member from said first position to said second position.

25 11. The stabilizer according to claim 10, whereby said piston is actuated by the flow of said drilling fluid through said drill string.

12. The stabilizer according to claim 10, wherein said piston is actuated by pressure applied to said piston by said drilling fluid.

30 13. The stabilizer according to claim 12, further comprising means for intensifying the pressure applied by said drilling fluid by said drill string.

14. The stabilizer according to claim 13, wherein said pressure intensifying means comprises a second piston.

5 15. The stabilizer according to claim 14, wherein said second piston has an enlarged diameter portion and a reduced diameter portion, and wherein said drilling fluid applies pressure to said enlarged diameter portion and said piston reduced diameter portion applies pressure greater than said drilling fluid pressure to said enlarged diameter portion.

10 16. A stabilizer for use in a drill string for drilling a bore hole, and through which a drilling fluid flows, comprising:

- a) a stabilizer body adapted to be mounted in said drill string;
- b) a movable stabilizer blade mounted on said stabilizer body and capable of moving into first and second positions;
- 15 c) a locking member locking said sleeve into said first position;
- e) means for applying a pressure to said locking member for unlocking said locking member in response to the pressure of said drilling fluid, whereby said blade can move into said second position when unlocked; and
- 20 f) means for intensifying the pressure applied to said locking member, whereby said pressure applied to said locking member is greater than said pressure of said drilling fluid.

25 17. A stabilizer for use in a drill string for drilling a bore hole, comprising:

- a) a stabilizer body adapted to be mounted in said drill string;
- b) a movable stabilizer blade mounted on said stabilizer body and capable of moving into first and second positions;
- 30 c) a sensor for sensing whether or not said stabilizer blade is in said first position.

18. The stabilizer according to claim 17, further comprising a magnet coupled to said movable stabilizer blade, and wherein said sensor is capable of sensing the presence of the magnetic created by said magnet.

5 19. The stabilizer according to claim 17, further comprising means for storing information representative of whether said sensor has sensed that said stabilizer blade is in said first position.

10 20. The stabilizer according to claim 17, further comprising means for transmitting information representative of whether said sensor has sensed that said stabilizer blade is in said first position to the surface of the earth.

21. A stabilizer for use in a drill string for drilling a bore hole, comprising:

- 15 a) a stabilizer body adapted to be mounted in said drill string;
- b) a sleeve rotatably mounted on said stabilizer body;
- c) a stabilizer blade projecting radially outward from said sleeve, said stabilizer blade having a distal end;
- 20 d) a pad mounted in said distal end of said stabilizer blade, said pad having first and second ends, a pivot joint pivotally coupling said pad first end to said blade distal end, whereby rotation of said pad about said pivot joint in a first direction displaces said pad second end radially outward so as to contact said bore hole wall.

25 22. A drill string for use in drilling a bore hole in an earthen formation, said bore hole having a wall, comprising:

- a) a drill bit;
- b) means for rotating said drill bit in the clockwise direction so as to drill a bore hole in an earthen formation;

c) a stabilizer mounted proximate said drill bit, said stabilizer comprising a housing and a stabilizer blade extending radially outward from said housing, said blade having a distal end;

5 d) a sensor pad mounted in said distal end of said blade, said sensor pad having first and second ends, said second end being circumferentially displaced from said first end in the clockwise direction, whereby said second end forms a leading edge when said drill string rotates in said clockwise direction, a pivot joint pivotally coupling said first end of said sensor pad to said blade distal end whereby rotation of
10 said sensor pad about said pivot joint in a counterclockwise direction displaces said sensor pad second end radially outward so as to contact and apply a force to said bore hole wall, said contact creating a friction force when said drill string rotates in said clockwise direction that tends to further rotate said sensor pad about said pivot joint in said
15 counterclockwise direction thereby increasing said force applied by said sensor pad second end to said bore hole wall;

e) a sensor mounted in said sensor pad for sensing a property of said formation.

20 23. The drill string according to claim 22, further comprising a compression spring for urging said sensor pad to rotate around said pivot joint in said counterclockwise direction so as to cause said sensor pad second end to contact and apply said force to said bore hole wall.

25 24. The drill string according to claim 22, wherein said drill bit comprises an eccentric drilling element.

25 25. The drill string according to claim 22, further comprising a reaming wing disposed proximate said drill bit.

26. The drill string according to claim 22, wherein said sensor is a resistivity sensor.

5 27. The drill string according to claim 22, further comprising means for limiting said rotation of said sensor pad about said pivot joint in said counterclockwise direction.

10 28. An apparatus for use in a drill string for sensing a property of an earthen formation through which said drill string drills a bore hole when said drill string is rotated in a first circumferential direction, said bore hole having a wall, comprising:

a) a housing adapted to be mounted in a drill string;

b) a blade extending radially outward from said housing, said blade having a distal end;

15 c) a sensor pad mounted in said distal end of said blade, said sensor pad having a circumferentially trailing first end and a circumferentially leading second end when said housing is rotated in the clockwise direction, a pivot joint pivotally coupling said first end of said sensor pad to said blade distal end whereby rotation of said sensor pad about said pivot joint in a counterclockwise direction displaces said
20 sensor pad second end radially outward so as to contact and apply a force to said bore hole wall, said contact creating a friction force when said housing rotates in said clockwise direction that tends to further rotate said sensor pad about said pivot joint in said counterclockwise direction thereby increasing said force applied by said sensor pad second end to
25 said bore hole wall;

d) at least a first sensor mounted in said sensor pad for sensing a property of said formation.

30 29. A method of further drilling a bore hole through an earthen formation, comprising the steps of:

a) inserting a drilling string having a stabilizer and an eccentric drilling element into said bore hole, said stabilizer having a rotatable stabilizer blade locked into a first circumferential orientation in which said blade is substantially aligned with said eccentric drilling element;

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b) unlocking said stabilizer blade; and

c) rotating said unlocked stabilizer blade into a second orientation in which said blade is circumferentially displaced from said eccentric drilling element.

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30. The method according to claim 29, further comprising the step of locking said stabilizer blade into said second circumferential orientation.

31. The method according to claim 29, wherein the step of unlocking said stabilizer blade is effected by pumping a drilling fluid down said drill string.

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